Postdoctoral research: Lawrence Livermore National Lab

My commentary on getting a job, working at, and then leaving a national lab.

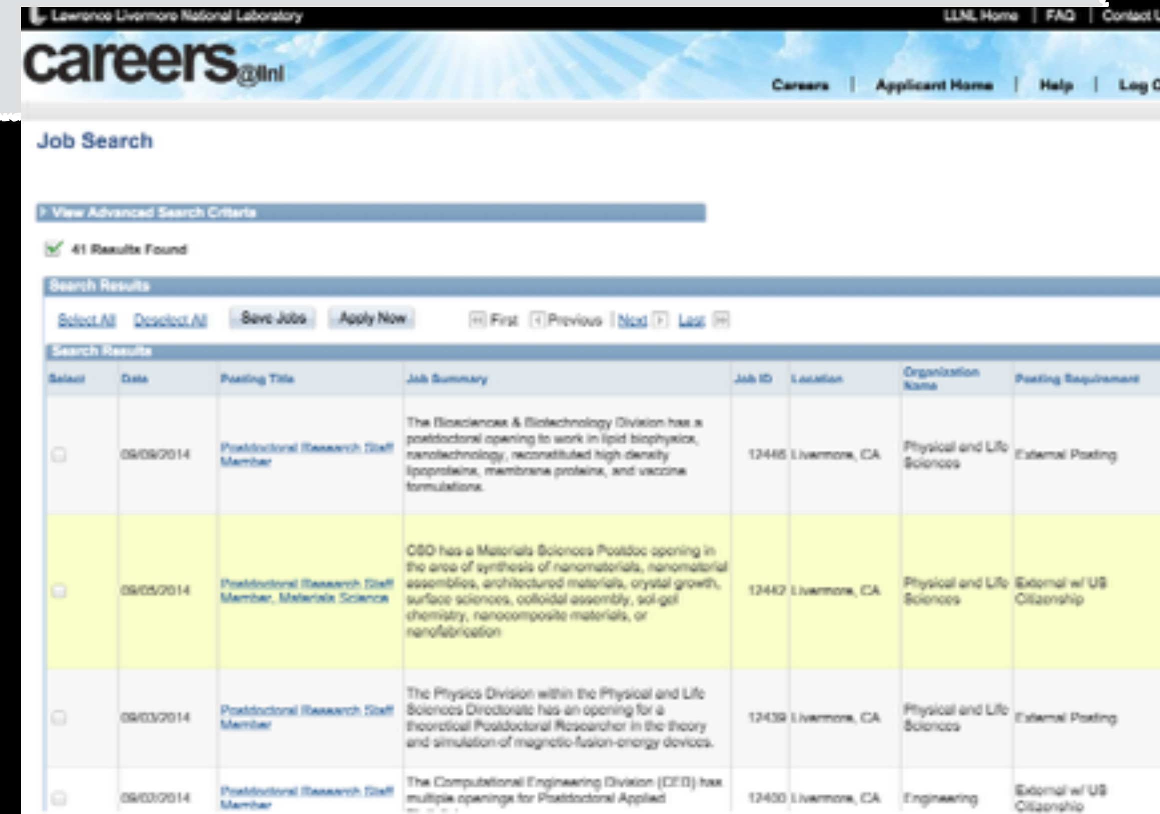
Jeremy McMinis

Overview

Timeline

- 9/2012 - Applied to usual fellowships
- 11/2012 - Interviewed
- 12/2013 - Graduated UIUC
- 1/2013 - Started at LLNL
- 12 months: work, work, work
- 1/2014 - Resigned from LLNL

Getting a job at LLNL



Lawrence Livermore National Laboratory

Getting the position

- Collaborator is staff there. NETWORK!
- Online application
- On site interview
- Funding cycles usually start in Q1, graduating in Dec is a plus!

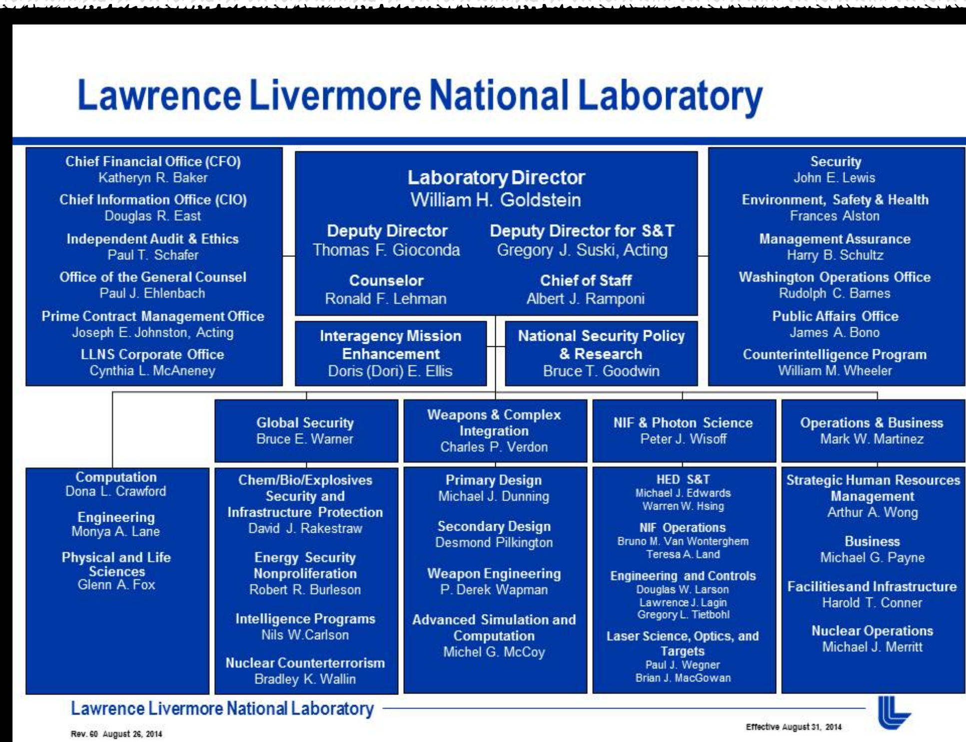
Job details

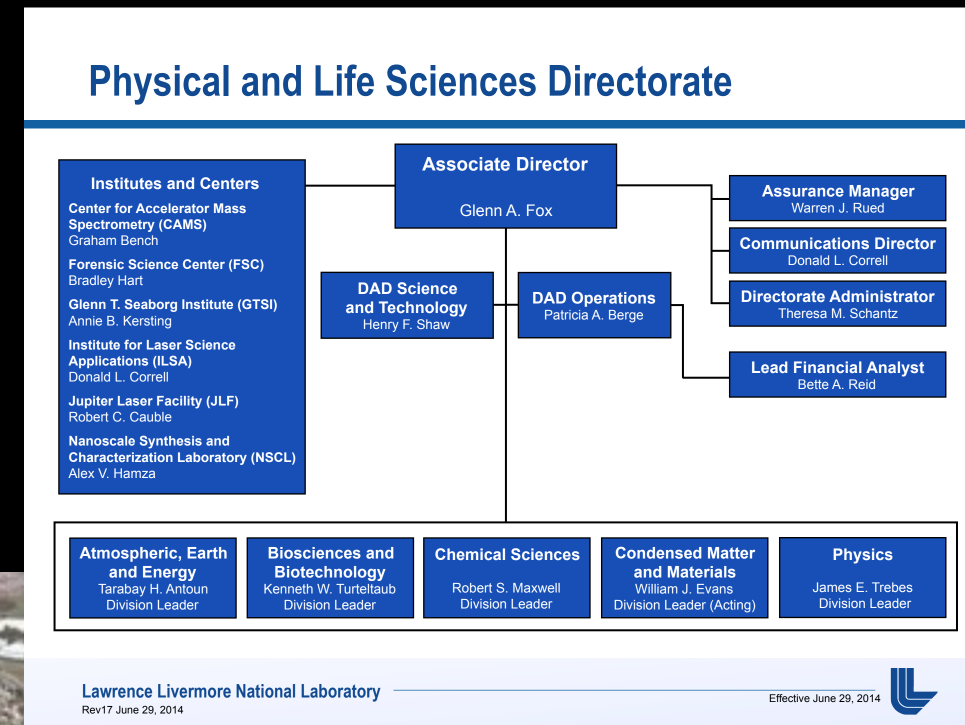
- "Regular" postdoc. standard terms.
- Advisor has a funding source
- $6K/month, 5% raises yearly (9% CA tax)
- 2 years + extendable up to 4 years

“Named Fellowship”

- Livermore Fellow
- Competitive
- More freedom
- $9K/month

Lab structure





- Hierarchical
- Lab mission
- Paperwork!!!

Lab structure

- Collaboration is encouraged
- Some interesting groups
- Can "moonlight" with permission
- Funding: LDRD, ERD, NSF and all that

About PLS home > about pls > condensed matter and materials division

Condensed Matter and Materials Division

Understanding the properties and performance of materials in support of scientific, technological, and programmatic missions

The Condensed Matter and Materials Division (CMMD) supports the core scientific and technological missions of the Laboratory, and executes world-leading, discovery-class research in the fields of condensed matter physics and materials science and technology. The CMMD research portfolio is driven by the Nation's needs in national security, energy security, high-energy-density science, basic science and advanced technology.

Ultrafast Dynamic of Materials. Understanding the dynamic response of solids under extreme pressures, temperatures, and strain rates is a foremost scientific frontier in materials science. CMMD scientists can directly probe phase transformations that result from dynamic changes in a material's lattice, using a combination of approaches that includes ultrafast x-ray probes, dynamic transmission electron microscopy, and large-scale atomic-level simulations. Our scientists can directly probe phase transformations that result from dynamic changes in a material's lattice, using a combination of approaches that includes ultrafast x-ray probes, dynamic transmission electron microscopy, and large-scale molecular dynamics simulations.

Nanoscience and Technology. Through the use of advanced synthesis and fabrication techniques, atomic-scale characterization, and quantum simulations, CMMD scientists are developing nanoscale materials to address significant national and energy security needs. High-resolution experimental studies, coupled with state-of-the-art simulations, are being used to predict their properties and technological impact. Nanoscale materials with tailored chemical, mechanical, electronic, and optical properties have the potential for revolutionary applications in areas that include novel catalysts, photonic crystals, advanced membranes, and thermoelectric materials.

High-Performance Materials Simulations. CMMD scientists simulate the properties and behavior of materials — from the quantum to the macroscopic scale — using the world's fastest supercomputers. Quantum simulations are enhancing our understanding of the thermodynamic properties of materials under extreme conditions. Atomistic simulations are providing new insight into nanocrystalline deformation, shock-driven phase transformations, radiation-damage effects and development of fluid flow instabilities from atomic-scale fluctuations. At the microstructural level, modeling of dislocation movement has uncovered novel mechanisms for dislocation motion and interaction.

Static and Dynamic High-Pressure Science. Using a diverse set of static and dynamic high-pressure experimental platforms, CMMD scientists create extreme states of pressure and temperature in the laboratory similar to those found in the center of the earth and large planets, such as Jupiter and Saturn. Diamond-anvil cells are used to statically squeeze and heat materials to high-pressure and high temperature conditions, while high-energy lasers and gas-guns produce extreme states of dynamic compression in materials. These research efforts are aimed at the investigations of the thermodynamic and constitutive properties of materials and fluids under extreme conditions of pressure and temperature. Advanced materials simulations are used in conjunction with these experiments to develop a first-principles understanding of the physical phenomena governing the response of materials under extreme environments.
> More about High Pressure Physics Group

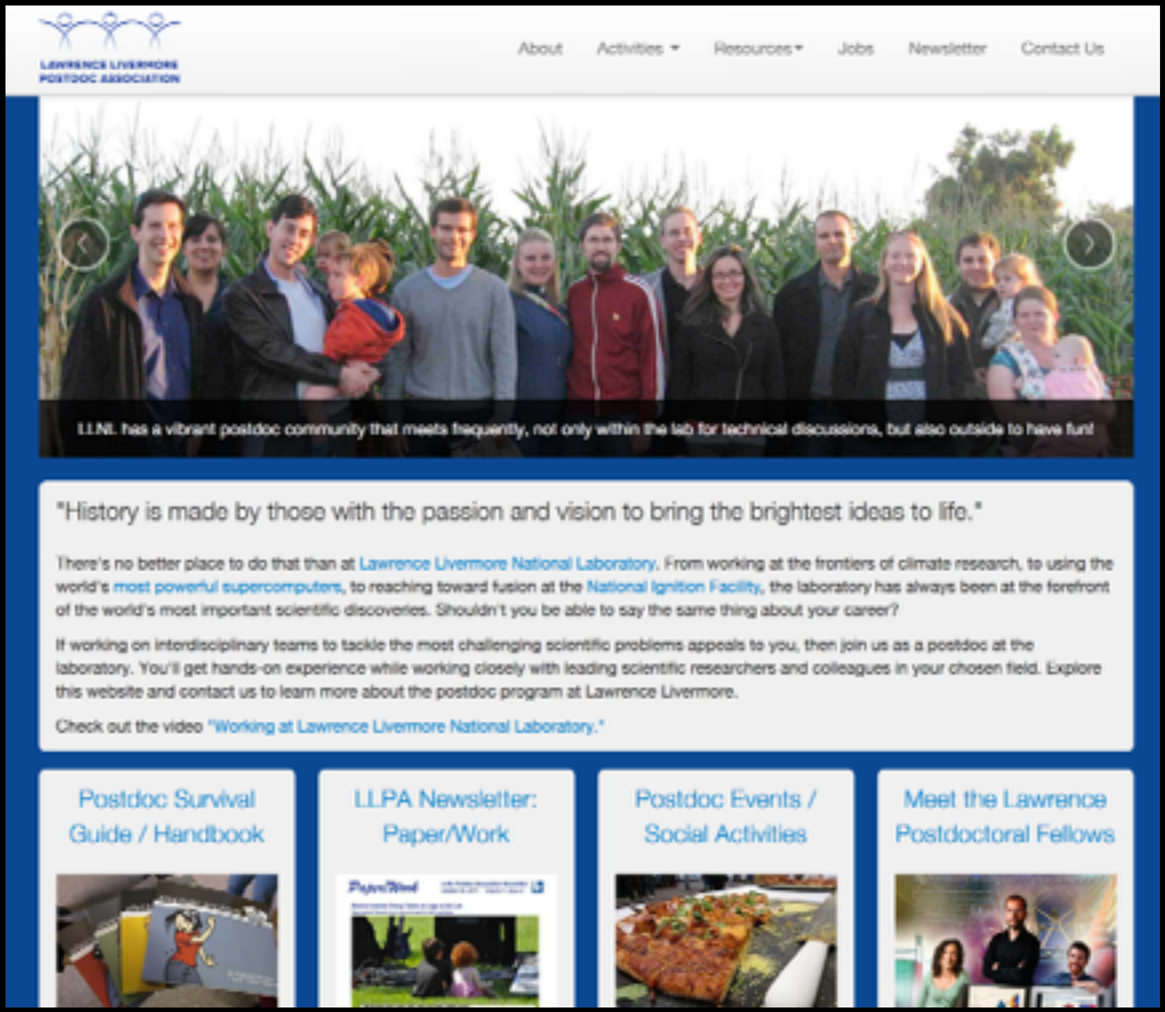
Actinide Science and Technology. The development of a fundamental understanding of the properties of actinides is central to LLNL's national security missions. CMMD scientists employ multiple approaches — including time-resolved observations, recovery-based studies, and large-scale computational simulations — to better understand how factors such as aging or extreme dynamic stress affect structural phases, strength, and damage evolution in actinides. Moreover, CMMD operates advanced materials characterization capabilities, such as electron microscopy and x-ray probes, to investigate the microstructure of actinides and to establish fundamental, science-based relationships between the structure, the properties, and the performance of actinides.

Optical Materials and Target Science. CMMD scientific contributions to the production of laser materials and to the understanding of laser-materials interactions have been central to the use of NIF at full laser energy. CMMD scientists play a key role in investigating the fundamental processes that initiate laser-induced damage in high-value optical components under high laser fluence conditions. CMMD leads the development of next-generation target fabrication, using its comprehensive metallurgical and nanoscience competencies.

EOS & Materials Theory. The EOS & Materials Theory Group in the Condensed Matter and Materials Division performs theoretical and computational condensed-matter and materials physics research in support of major Department of Energy and LLNL programs. This research includes fundamental quantum, atomistic and multiscale modeling and simulation of materials properties over wide ranges of temperature and pressure and can extend from bulk solids and liquids to defects, surfaces and interfaces to nanostructures.
> More about EOS & Materials Theory Group

Computational Materials Science Group. The Computational Materials Science Group conducts materials simulations at the frontiers of Large-Scale Computing. The group studies solid materials and dense plasmas at the atomic level for basic science and for programmatic missions, largely supported by DOE. The group has a demonstrated expertise in developing codes for massively parallel (100,000+ CPU) simulations, and is actively pursuing code advances that will enable efficient materials simulations on the next generation of supercomputers.
> More about Computational Materials Science Group

Daily Working Life



- Focus on your work
- No strong pub pressure, results driven
- Post doc association is fun
- Not so much theory as applied work
- Some time to work on your own stuff

Career Possibilities

- Conversion to staff
  - Through LDRD, or ERD, funding
  - Somewhat fickle (congress funding)
  - ~120K/year. Hard to buy housing in Livermore
  - "Behind the fence” US citizenship
- Another postdoc, faculty, staff at another lab
- Silicon valley - next talk

Questions?